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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

COMPONENTS OF HIGH EFFECTIVENESS IN CONSTRUCTION INDUSTRY

Kiev KOMMUNIST UKRAINY in Russian No 7, Jul 79 pp 44-53

[Article by Ye. V. Kunda, director of Section for Construction and Public Utilities, Central Committee, UkCP]

[Text] In his Accountability Report to the Central Committee of the 25th CPSU Congress, Comrade L. I. Brezhnev stated: "There is no way to solve the numerous economic and social problems facing our country successfully except for rapid growth in the productivity of labor and a dramatic increase in the effectiveness of social production as a whole."

Capital construction, which is a major factor in expanded socialist production, the renewal of fixed production funds, technical rearmament of the national economy and improvement in the allocation of productive forces occupies one of the primary positions here.

It is in third place after industry and agriculture in its share of the gross national product. Approximately 14 percent of the labor force and service personnel occupied in the sphere of material production are employed in this sector. Therefore, improving matters in capital construction by the most direct means available has an effect on a general increase in the efficiency of the national economy. Success in capital construction, in turn, is largely dependent on how the construction industry organizes itself and to what extent the contracting organizations operate in harmony.

In an examination of the components of high effectiveness in the construction industry, it is first necessary to discuss improvements in the planning of capital investments and contract operations. The results achieved in construction over the 3 years of the 5-year plan would appear more impressive if the problem areas in these matters were eliminated.

Unfortunately, up until now, stopping the process of fragmenting capital investments over numerous projects has not been successful. Some ministry

clients have attempted to obtain an increasing share of the resources for the construction of new enterprises during the planning process on the condition that there is frequently not enough for previously started projects. According to the Ukrainian SSR Ministry of the Food Industry, for example, there is a shortfall against the 20.6 million rubles needed on 29 projects in transition for the current year, although at the same time a number of new projects with an estimated cost of 38.3 million rubles have been included in the plan. By the same token, because of the shortage in capital investments, the ministry has had to put 20 projects started previously on hold.

It is also very important to distribute the annual assignment by quarters. While a major effort in operation is planned for the 4th quarter, as it happens this is most unfavorable for the construction industry. In 1979, 326 major starts and projects in the production category (58 percent of the annual program) were planned to open during the 4th quarter, whereas during the first quarter this figure was less than 4 percent. In public and residential construction more than 40 percent of all sites were expected to be in service at the end of the year.

The lack of balance between plans for capital investments and the capacities of the construction and installation organizations and support for projects with material-technical and labor resources continues to be a major trouble spot in the operation of planning elements, which has a negative effect on the efficiency of the construction industry. Each construction organization must have a stringent, but realistic plan of operation backed by material and labor resources. In fact, if a well thought-out plan for the sequencing of operations and a schedule for the transition from project to project is made up for this purpose, there will be sufficient numbers of personnel, transport and equipment resources.

It has been properly said that a project starts with a plan. In actuality, the quality of the future structure depends on the quality of the plans. The plans must spell out progressive as well as the most economical technical and technological solutions and all innovations must be tied into the actual capabilities for their implementation within it. Blueprint designs that have not been thought through and changes in the course of construction brought about as a result will generally lead to an increase in the estimated cost of the projects. Within the republic during the 1976-1978 period, the estimated cost of 383 projects increased by 1.5 billion rubles or 31 percent over the original estimate. This type of situation imposes great difficulties on the organization of operations and extends the time required for construction.

It is also important for a plan to be submitted to the builders on time, that is, no later than 1 September of the year preceding the year of construction. This nationwide directive is not being fulfilled by a number of clients. As of 1 September 1978, plan-estimate documentation had

not been filed for projects in the plan for the current year amounting to 407 million rubles (3.4 percent) including a number of projects under the Ministry of the Coal Industry of the Ukrainian SSR, the Ukrainian SSR Ministry of Highway Construction and the Ukrainian SSR Ministry of the Food Industry.

Without the timely receipt of technical documentation and its thorough study, the necessary engineering groundwork for a construction project cannot be carried out. It is not a simple matter to organize the operations involved in a major project of today and to order the materials, piping and structures on time. It is also necessary to work out and coordinate the sequence and schedules for operations, the set-up of equipment, the conclusion of general and subcontract agreements and much more with management.

Increasing the effectiveness of the construction industry is also a function of the status of material and technical supply. In our view, it is necessary to establish a uniform order of supply with funded and centrally allocated materials according to instructions from the contracting organizations on the basis of requirements specified in the plans and estimates. The procedure for the allocation of resources that exists today based on norms per million rubles of construction operations for a specific project does not do the job. Unfortunately, shifting construction organizations to a new method of material and technical supply via the territorial elements of the USSR Gosnab has not as yet proven itself.

In organizing the fulfillment of plans for capital construction, an important factor determining success in business-like relationships between clients and contractors based on the efficient performance of functions by each party as stipulated by current construction law. Unfortunately, these business-like relationships seldom prevail, even though the goal is the same for builders and contractors alike. They are also basically dependent on the qualifications and level of the client's service operation. Builders frequently cannot begin work on time due to the fact that the issue of technical documentation, the relocation of tenants and demolition of buildings located within a redevelopment area have been delayed or financing is not made available on time. A great deal of time is lost by installation personnel as a result of the incomplete set-up of equipment which is frequently defective. It is obvious that the question is now ripe on the need to supply projects with equipment through the general supply of organization of USSR Gosnab and for a general supplier--the main enterprise of the machine-building ministry. In one way or another, this is all the direct obligation of clients. Frequently, they have settled their discrepancies by the end of a year, however, 3-4 months have been irretrievably lost and the entire responsibility for defending schedules is left to the builders as a rule. However, it must not be forgotten that success in the matter of capital construction depends to an enormous extent on the action of the clients.

"We frequently and rightfully criticize builders," noted Comrade L. I. Brezhnev in his remarks to the November (1978) Plenum of the CPSU Central Committee. "However, fairness demands that we also talk about their enormous contribution to the growth of the economic strength of the country."

The Soviet Union has rightfully been dubbed a huge construction site. In terms of the rate of capital investment our country has no equal in the world. In comparison with 1970 investments have increased by more than one and a half while investments in the Federal Republic of Germany increased by only 3 percent and those in Italy grew only 1 percent. In 1978 the volume of capital investments in the USSR exceeded the total resources spent for these purposes in the United States.

The construction program for our republic during the 10th Five-Year Plan is likewise epic in scale. We must develop approximately 94 billion rubles of capital investment, which is 19.5 percent more than during the 9th Five-Year Plan. Implementing these plans is possible only through an intensive increase in the capabilities of the construction and building materials industries.

This policy has found reflection in the program for developing the industrial base of capital construction and the building materials industry in the republic during the 10th Five-Year Plan which was ratified by the UkCP Central Committee and the UkSSR Council of Ministers and which provides for the creation of modern enterprises and industries to produce industrially efficient structures, elements and materials, primarily those in short supply (light metal structures, items made of light- and high-strength concretes, porous aggregates and the like). In addition to the introduction of new capacities, it is considered considerably better to use existing enterprises, to intensify the technological processes and to refit older industries and, on this basis, to increase the output of effective materials and structural goods.

In turn, within the republic the volumes of prefabricated construction are increasing; its specific share over the past year amounted to 55 percent of the total volume of construction and assembly operations as opposed to 47.6 percent in 1975. In residential construction 49 percent of the buildings under construction through state and cooperative resources were built from large panels and 13 percent were built from large unit blocks. Fifty-four home construction combines and enterprises with a capacity of 7.2 million square meters total area per year are now operating, with more than a third working on the production of homes in new series. The technology of production is also being upgraded.

It must be noted that there are shortcomings and unresolved problems within the efforts to develop the material and technical bases of construction. Plans are not being fulfilled for the construction of projects in the building materials industry under the Ukrainian SSR Ministry for Heavy

Construction and the Ukrainian SSR Ministry for the Construction Industry. Some party committees, specifically the Dniprjetskaya, Lvivskaya, Nikolayevskaya, and Kharkovskaya oblast committees and the Kiev party gorkom do not always react astutely and functionally to the facts of unsatisfactory fulfillment of quotas to develop a production base and make use of existing capacities or the slow introduction of new, efficient designs and materials into construction.

The functioning of the contracting ministry, their organizations and party committees must be aimed at overcoming the shortcomings noted and towards implementing the program planned for the development of an industrial base for construction. The need for this has been stated quite clearly, beginning with a report to the April (1977) Plenum of the U.S.S.R. Central Committee by Comrade V. V. Shcherbinskiy, a member of the Politburo of the CPSU Central Committee and the first secretary of the UkCP Central Committee. "It is impossible to achieve substantial gains in capital construction without progressive growth in the capacities of the industrial base."

Upgrading the organization of production and the management sector is an important component of effectiveness. This is an extremely complex and broad problem. Increasing the level of concentration and specialization in production are the basic directions of development for the USSR national economy during 1976-1980. Within the republic, the workload of trusts has increased by 12 percent during the years of the 9th Five-Year Plan while the number of small construction organizations has decreased by 3 percent.

An increase in the capacities of contracting organizations as a result of their consolidation and specialization through the creation of large associations with an annual operational volume of 150-300 million rubles and trusts which become a part of these associations with operational volumes of 50-75 million rubles is foreseen.

Purposeful efforts to increase the level of engineering groundwork and control and to introduce the progressive technology of construction and installation operations is an important key for improving the organization of the construction industry.

Today, in a setting of high industrialization, the organizational plan for construction which must be conducive to timely introduction of industrial capacities with minimal expenditures takes on a very important role. Developing plans for operational execution that will make major reductions in their duration and cut costs is of great importance for the proper organization and technological sequencing of construction.

The unitized method of preparing, organizing and administering construction developed by the Kiev engineering-construction institute and the republic's Ministry of Heavy Construction is achieving ever-increasing popularity on major industrial projects and complexes. On 14 June 1976, the Central Committee of the Communist Party of the Ukrainian SSR

approved this trial and recommended its widespread implementation. During the construction of blast furnace number 9 at the "Krivorozhstal" plant, the use of this method aided in achieving an average annual increase in the productivity of labor in the amount of 11 percent as opposed to the 8 percent stipulated by the plan and in showing profits in the amount of 25 million rubles. Due to the reduction in the amount of time required for construction in comparison with that anticipated, production worth 24.4 million rubles was additionally yielded. Last year, 160 major industrial projects were built by this method.

"Building quickly, economically and on a modern technical basis are the components of high effectiveness in capital construction," noted Comrade L. I. Brezhnev in his accountability report to the 25th CPSU Congress Central Committee.

It is this reduction in the time required for construction that has, incidentally, the most important effect on elevating the effectiveness of the construction industry. It is possible to give a number of examples of good operational organization where large production capacities, projects and entire enterprises went into service with considerable curtailment of the standard periods allowed for construction. For example, construction of the Zaporozhiye State Regional Electrical Power Station, which is the largest in the country, was completed 18 months earlier than specified by the norms; the first phase of a caking mill for the Dneprovskiy ore dressing combine was completed 9 months early, and production to manufacture 150,000 tons of steel pipe at the Novomoskovskiy pipe plant opened 2 months early.

For the purpose of increasing party influence on the efforts directed at shortening construction dates and accelerating the opening of capacities and projects, a further upgrading of the structure of party organizations has been undertaken in a number of oblasts in the republic. The joint party committees "Glavl'vovstroya," the combines "Vinitspromstroi," "Khersonpromstroi," "Volyn'promstroi," "Nikolayevpromstroi," "Sumpromstroi" and others have been set up and are operating successfully. They consolidate the party organizations for the construction, installation and transport organizations and enterprises of the construction industry functioning within the operational zone of a construction combine. The largest of these are licensed by the rayon party committees and their activity has increased significantly.

Without question, this positive experience must be extended to other large contracting organizations where there are suitable conditions.

"The route to effectiveness," stressed Comrade L. I. Brezhnev at the November (1978) Plenum of the CPSU Central Committee "is, of course, inseparable from acceleration in scientific and technical progress." Every step in this direction is a transition to a new and much higher degree of industrial intensification whose ultimate goal is to obtain the

greatest economic effect and the greatest volume of high quality production with the least expenditures. This is especially true in the construction industry.

Everything starts with the effort to upgrade the planning process. It must first be directed toward the use of the most up-to-date production technology in planning the use of equipment with increased unit capacities, reducing the weight of buildings and structures through extensive use of light-weight materials and structural members, constructing high-rise industrial buildings which will make it possible to increase the productivity of enterprises in the same amount of space and grouping compartments under a single roof, etc.

Belt-block installation of roofing in single-story industrial buildings is worthy of attention in the conduct of construction and installation operations. During 1975-1978, approximately 600,000 square meters were built by this technique within the republic to include the shell for a magnetic starter shop at the Aleksandriysk electromechanical plant, pipe-drawing shop No 4 of the Nikopol' southern pipe plant, the main housing for the Lutsk spinning and weaving mill and others. When roofing is installed by this technique, the productiveness of construction and installation operations increases by a factor of 1.7 - 2.2 while the savings in construction time reaches from 2 to 4 months.

Accelerated installation of structural parts and outfitting with heavy assembly units weighing from 100 to 400 tons or more has also become popular. To achieve the appropriate results, it is necessary to supply construction sites with not only natural resources and materials, but also with structural parts manufactured at enterprises of the construction industry with a high level of factory finishing. At present, enterprises of the construction industry are already contributing to the processing of materials into ready-made units whose cost is approximately 40 percent of the entire cost for the material resources and, by 1980, their anticipated share will increase to 42-43 percent.

It stands to reason that it would be impossible to achieve increases in the effectiveness of the construction industry without the existence of highly qualified stable cadres.

The work of builders is surrounded by the honor and respect of the Soviet people. In our republic, 170,000 communist and 82,000 members of the Komsomol are involved in construction projects. We may rightfully take pride in our many progressive workers, engineers and technicians.

Based on the results of the 8th and 9th Five-Year Plans and the past 3 years, more than 25,000 workers in the republic have been awarded orders and medals of the USSR and 1,240 persons now have the honored title of distinguished builder of the Ukrainian SSR for their valiant efforts.

The high rank of heroes of socialist labor have been awarded to several dozen of the best. Among these are Comrades I. D. Ganchev, V. S. Plakhotin, I. I. Bushma, V. M. Zabolotnyy, I. I. Garin, I. S. Kravtsov and many others serving as leaders of coordinated teams.

The duty of party, advisory and managerial personnel is to treat cadres with care and to bring along a new generation of highly qualified specialists capable of furthering the development of the construction industry in the republic. Special attention must be focused on the middle-level teams that act as the direct organizers of the construction industry and educators of the labor force as was urgently discussed at the April (1977) Plenum of the Central Committee of the Ukrainian Communist Party.

The recently adopted resolution of the CPSU Central Committee and the USSR Council of Ministers "On Measures for Further Improvement in the Training of Qualified Cadres and their Consolidation within the Construction Industry" is a new manifestation of the constant concern of party and state for the needs of builders. The modern construction industry requires technically competent experts for its business. It is important that the training of the next generation not be allowed to drift. If contracting organizations are continually concerned with increasing the qualifications of cadres, if the capacity for highly productive work is created and if social and everyday problems are resolved, then stable collectives of builders will develop and this, in turn, will speak positively to an increase in the productivity of labor and other indicators.

A universal reduction in labor intensiveness has been and continues to be one of the key issues of capital construction. Unfortunately, the task of increasing the productivity of labor over the 1976-1978 period has not been completed. The reason for this is deficiencies in the implementation of measures to introduce the achievements of science and technology, the unsatisfactory organization of construction and the conduct of operations.

Still more is facing the construction ministries and directorates, planning and scientific-research institutes and contracting organizations to reduce the numbers of persons involved in hand labor. This is slowly being decreased and over the past 10 years has shown a total decline in the republic of from 61.8 to 52.9 percent.

At present, the contracting ministries and offices of the republic are making the transition to supplying construction crews with technological inventories of resources for mechanization which, as experience has shown, will considerably increase output.

For the purpose of accelerating the supply of builders with the necessary resources for low-level mechanization and mechanized tools, the construction of three enterprises to manufacture these items is foreseen within the republic although the dates for the opening of these enterprises has

been delayed. Less than half the capital investment has been utilized over the past 5 years for construction of a plant in the Chernukhino settlement of Voroshilovgradskaya oblast, for example, and it is supposed to be in service in 1980. The Ukrainian SSR Gosplan and the ministries which administer the construction of the enterprises noted must insure unconditional adherence to the dates set for placing them in service.

Finished work continues to be the most labor intensive of operations. Its level of labor consumption during the construction of residential and public buildings often reaches 40 - 50 percent of the total labor expenditure. Since 65 million square meters of plaster work and 150 million square meters of paint and paper work are completed annually within the republic, this demands a serious upgrading of their organization, the introduction of the broken-flow technique, the supplying of crews with efficient technological inventories of mechanized equipment, tools and stock materials. The output per man-day among plaster crews in the Ukrainian SSR Ministry of Heavy Construction was an average of 21.5 square meters of plaster work which exceeds the daily norm by a factor of 2. It was estimated that extending this experience to projects in the republic would make it possible to free up to 5,000 plasterers and painters and increases the shift output by a factor of 1.5 - 2.

The crew contract occupies an important position in the fulfillment of tasks to increase the productivity of labor. During the past year, 13,500 crews, or 38 percent of the total workforce, worked according to this method and they performed one-third of the total volume of construction and installation operations. Based on findings from a study of the activity of more than 750 crews from various ministries and offices, the time involved in the construction of projects was reduced by 17-20 percent, the productivity of labor increased 20-25 percent and savings amounted to an average of 3-4 percent of the estimated cost of the work completed. All the projects built by these crews were opened with an evaluation of "excellent" or "outstanding."

It is necessary to extend the experience of the "Vinitpromstroil" combine in upgrading the engineering groundwork for production to planning, mustering and accounting for a construction crew. Here, a composite calendar plan of operations and a composite plan for the technological-production composition of crews is compiled. A transition is effected from the material-technological supply for a building or project to the technological-production composition of a crew which is conducive to a guaranteed daily allocation of resources for each crew in accord with proven plans. The directorate for the production and technical supply of a combine and the construction industry plants subordinate to it becomes the only organization providing crews with the necessary resources.

Thus, the search for more effective techniques to organize the functions of lower-level teams results in the fact that the new principles of cost

accounting extend beyond the framework of a crew and are spreading to the largest lower-level subdivisions and entire construction combines.

One of the most important components of high effectiveness in the construction industry is socialist competition. It is called upon to resolve not only these issues but also to provide solutions for many social problems as well.

"Competition today is inseparable from the scientific revolution," stated Comrade L. I. Brezhnev at the 26th congress of trade unions. "It is increasingly concentrated on the problems of effectiveness and quality. It is aimed at achieving the best possible final national economic results."

Builders in the republic have made a worthy contribution to the development of socialist competition during the 10th Five-Year Plan. Remarkable new incentives, initiatives and foundations directed at the best use of reserves, the introduction of progressive techniques in the organization of operations, elevating the productivity of labor and cutting down on the time of construction have sprung up in the course of competition among collectives.

The CPSU Central Committee has approved a cost initiative for collectives of the nation's construction organizations including those from the city of Kiev and the Zaporozhskaya oblast which saw to it that all projects were opened early or on time. This undertaking is widely supported. Many projects and capacities have opened earlier than the date set, particularly in the "Bolshevik" and polymer plants in Kiev, the Odessa port plant, an ore-dressing combine in Komosomol'sk and other cities. Capacities at the Zaporozhskiy "Kommunar" automotive plant, the Poltavsk and Lvov sugar plants opened on time.

Complex competition based on the principle of "work relays" have been organized in the Sumskaya oblast as they have in a number of other parts of the country in projects for enterprises for mineral fertilizers and chemical machine-building.

It is also necessary to note that cost initiatives do not always find widespread distribution. Competition takes place on a formal basis in a number of projects although the timely or early fulfillment of plan quotas and socialist obligations to open capacities and projects as well as to increase the productivity of labor have not yet become the basic evaluation criteria everywhere.

The duty of party and trade union organizations of the ministries and offices, the enterprises and projects is to continually uphold a high level of working stress in competition for the fulfillment and overfulfillment of quotas for the 4th year of the five-year plan, to achieve new limits of effectiveness in production. Better utilization of the training potential of socialist competition, operationally and extensively

informing personnel as to its progress and considering not just the production indices but also the status of educational efforts are tasks that have been set forth in a recently adopted resolution of the CPSU Central Committee "On the Further Improvement of Ideological and Political Educational Work."

The CPSU Central Committee and local party organs are constantly concerned about further increases in the effectiveness of the construction industry. Over the past few years the UkCP Central Committee has approved a number of worthwhile undertakings for builders' labor collectives, some of which have been noted above.

Such important issues as the course for fulfilling the quotas of the 10th Five-Year Plan to increase the productivity of labor and in regard to the organizational and political operation of the Donetskaya oblast committee of the Communist Party of the Ukraine to insure fulfillment of construction plans and the opening of industrial plants, the development of an industrial base for capital construction and the building materials industry within the republic during the 10th Five-Year Plan have also been examined.

The oblast committees of the party, in turn, support new undertakings and incentives that will be conducive to an increase in the efficiency of the construction industry. The Donetskaya oblast committee of the party, for example, has approved a trial in the development of party staffs at major construction sites. These were in active operation during the construction of the "3600" rolling mill complexes, an oxygen conversion shop at the "Azovstal'" plant, the Donetsk cotton combine and other projects.

The party staff set up by the Gorlovskiy party gorkom, for example, acquitted itself well during the construction of large complexes to manufacture ammonia and carbamide in the Gorlovskoye industrial association "Stirol." Operational groups to coordinate the functions of party organizations and subdivisions taking part in construction, organizing competition, supervising propaganda, radio broadcasting, distributing printed matter, conducting cultural and recreational activities, improving daily life, nutrition, trade and medical services for the builders, protecting the social order and providing transport for shipments were set up as a part of the staff headed by Comrades N. G. Koval' and N. F. Fomenko, the secretaries of the party gorkom.

The staff has shown a continuing concern for the proper allocation of communists in the decision-making elements as well as for the timely establishment of party groups in the crews and teams. On its initiative, internal checks on the staffing of organizations with workers, the status of industrial and sanitary conditions and adherences to a program of economizing have been set up. This has actively aided builders in assuring the timely supply of materials and equipment, it has seen to a clear-cut organization of set-up operations and the training of service personnel.

As a result of the vast organizational effort of the gorkom, the party project staff and all communists, workers, engineers and technicians, huge new capacities to produce valuable raw materials for the manufacture of mineral fertilizers have been opened up.

The Dnepropetrovskaya oblast committee, the city and rayon party committees, party project organizations and oblast construction industry enterprises have focused a great deal of attention on the issues of technical progress and the increase in the productivity of labor. Councils for co-operation between science and industry, masters' days and clubs for business meetings, organizing information from the party-economic activist element as to the experience of leaders and the conduct of oblast displays must be listed as among the new forms of work.

The Kharkovskaya oblast party committee which has developed and is implementing a complex plan for elevating the efficiency of the work of construction, design, and scientific-research organizations and enterprises in the oblast's construction industry have shown good initiative. The Lvovskaya oblast party committee has supported a worthwhile undertaking. Since 1976, a complex system of quality control in construction began to be introduced within the "L'vovpromstroi" trust which makes it possible for builders' collectives to turn over most of their projects with a rating of "excellent" or "outstanding."

On the initiative of the Order of Lenin Construction-Installation Trust No 1 under the Ukrainian SSR Ministry for Industrial Construction's "Kievpromstroi" combine, builders from the Donetskaya, Voroshilovgradskaya, Krymskaya, Poltavskaya, Cherkasskaya, Ternopol'skaya and other oblasts have engaged in a competition for the early and on-time opening of all starting projects.

Issues of immense national importance are confronting builders in the republic. "It is now necessary to insure a concentration of efforts and resources on the most important starts which are of a first priority national importance..." noted Comrade V. V. Shcherbinskiy in his report to the December (1978) Plenum of the UkCP Central Committee.

In the time remaining before the end of the year, there is still much to do and the sum total for the 4th year and the 10th Five-Year Plan as a whole depend on how timely and meaningful this contribution will be as well as on how rapidly and fully all the reserves for increasing the effectiveness of the construction industry are put into action.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

NEW SYSTEM OF MANAGEMENT IN CONSTRUCTION INDUSTRY REPORTED

Moscow PRAVDA in Russian 22 Sep 79 p 2

[Article by A. Mitrofanov, director of the Scientific Research Institute of Construction Economy of Gosstroy of the USSR, doctor of economic sciences and professor: "Begin Even Today"]

[Text] The enormous practical experience of economic and planning activity in the field of capital construction, innovator beginnings and the experiments of builders and the results of many developments of scientific research collectives found concentrated reflection in the decrees of the party and government on improvement of the economic mechanism. I shall dwell in my view on the main characteristics which determine the trend and essence of measures to improve the planning of the economic mechanism in capital construction for purposes improving its efficiency.

A definite separation from planning of the production program of the ministries and agencies and customers was established in planning capital construction, which resulted in a lack of desire to seek reserves to improve the use of existing capacities. The economic managers revealed a desire to solve problems of increasing capacities primarily due to new construction.

The complex of measures formulated in the decree of the CPSU Central Committee and the USSR Council of Ministers provides for allocation of capital investments to development material production sectors for a planned increase of the production volume and services, development of planned balances and calculations in the use of available production capacities and basic funds and summary plans for construction and technical reequipping of existing enterprises.

Thus, tasks on technical reequipping and reconstruction are being determined in the planned tasks to put production capacities into operation and the limits of capital investments of customers and indicators with respect to contractors. It is pointed out in this case that funds for construction of new and expansion of existing enterprises are allocated if the needs of the national economy for a given type of product cannot be provided by existing enterprises with regard to restoration of them.

No less an important task is provision of stability and continuity of the action of capital construction plans. The time has long come for this problem. An entire new order of capital construction planning proceeds from the need to have a stable five-year plan both of customers and contractors. Solution of this cardinal and let us say directly difficult task requires great persistence of all construction participants. The instructions that the limits established in the five-year plan are not subject to reconfirmation in the annual plans must be noted among the measures to provide stability of capital construction plans.

The technical-economic justifications for inclusion of new construction projects, objects and work into the plan should be significantly improved to provide stability of the plans and to exclude unreal tasks and those unbalanced with resources. The entire order of development of five-year and annual plans, lists of new construction projects that have begun and the procedure for provision with planning-estimate documentation, equipment and structural members is directed toward providing continuity of the action of plans.

Provision of continuous action of current plans is of enormous significance to builders. Moreover, this task has now been universally fulfilled. This was convincingly demonstrated, for example, by the experiment of the Orel builders and of such a large construction formation as Glavmosstroy [Main Administration for Housing and Civil Engineering Construction in Moscow City], where a two-year schedule of ongoing construction has been worked out since 1976.

It is important for successful and timely fulfillment of the plans for putting capacities and objects into operation that all participants of construction have tasks calculated for the final product in the plan. This task will now be solved thusly. The first indicator for customers and contractors remains introduction of production capacities and objects into operation. It has also been established by organizations installing the main production and energy equipment by agreements, which should be delivered by the supplier enterprises in complete sets.

The task on the volume of commercial construction products (the cost of construction-installation work by enterprises, units, starting complexes and objects turned over to the customer and prepared for output of products or rendering of services) has been established to tie in the work of builders with the task of the customer on putting basic funds into operation and also for calculations. The ministries and customer agencies confirmed this indicator to subagency associations, enterprises and organizations.

The indicator was tested in a number of large formations, including those at Glavmosinzhstroy [expansion unknown]. A check showed its reliability. It orients the construction organizations toward rhythmic fulfillment of work, provision of finishing for starting objects and timely introduction of them into operation. But one other very important condition is necessary: that

the customer actively participate in formation of the plan and fulfill all other obligations on time for this indicator. It is because of this that the customer frequently stands aside from this activity and the builders suffer.

An end is now being brought to this organizationally. But it is very important that clear procedural instructions for the contractor and customer be worked out to implement measures on planning of the indicator of commercial construction production, provided for in the decree of the CPSU Central Committee and the USSR Council of Ministers. This is a matter for Gosplan of the USSR and the scientific collectives, specifically VSES [Scientific Research Institute of Economics and Construction].

With regard to the new system of confirmed indicators, one must dwell on the limits of capital investments established for the customer. This is also a new indicator and its maintenance and purposeful designation should be felt by everyone. A specific procedure of planning and use of capital investments will obviously still be established by Gosplan of the USSR. However, it is necessary in the interests of the matter that the ministries and agencies--the managers of the capital investments--not be permitted to constantly redistribute funds among construction projects and objects and to open new construction before completion of previously planned construction. This is now the root of evil and the primary reason for dispersion of resources in construction and the unrestrained growth of "uncompleted projects."

Capital construction is the main channel for introduction of the advances of scientific and technical progress into production. Therefore, it is important that these advances find their most complete expression in the plans and that they provide introduction of a highly effective production technology and the use of the latest equipment. It is for these purposes that programs for solution of the most important scientific and technical problems, plans for increasing the technical level of the sectors, review of obsolescent standards for machines and equipment, evaluation of their technical level and provision of planning usually on a competitive basis with extensive recruitment of highly qualified specialists that will serve these goals in the final analysis.

It was pointed out in the decree for the need for gradual transition during the 11th Five-Year Plan to planning labor productivity in construction-installation organizations by net production (normative) or by another indicator which more accurately reflects the variation in labor expenditures. The index of labor productivity by net production has already proved its viability and feasibility in many sectors of industry. Glavmospromstroymaterialy [Main Administration of the Building Materials and Structural Parts Industry of the Mosgorispolkom] achieved greater success on all problems of activity based on this indicator. The experience of Voselektromontazh Trust No. 1 of Glavmosstroy [Main Administration for Housing and Civil Engineering Construction in Moscow City] is interesting.

Analysis of economic activity of organizations by the results of fulfilling the tasks for putting production capacities and objects and commercial construction products into operation and increasing labor productivity and profits was posed in the "point of the angle" of the economic mechanism among builders and also for solution of all problems on economic stimulation of them. It was planned to complete introduction of calculations among customers and contractors in 1961 by completely finished construction and enterprises, starting complexes, units and objects turned over for operation. The order of calculations with the budget is being refined. A new procedure for covering planned expenditures and advance consumption of the material incentives fund has been universally established. The order of crediting the activity of contract organizations has been refined in the direction of more complete coverage of their expenditures with regard to conversion to calculations for the final product and intensification of responsibility for consumption of credits obtained. The scope of prizes for timely introduction of production capacities and objects into operation up to an average of three percent of the estimated cost of construction-installation work is being increased.

Awarding prizes to workers of construction-installation and planning organizations and also associations and customer enterprises for completing work on technical reequipping has been established in scopes and in the order with respect to work on reconstruction, that is, differentiated by sectors and at a higher level than in construction of new enterprises. These funds will be specially provided in the estimates. Correcting sector coefficients to existing estimate norms for work on technical reequipping and reconstruction and norms of overhead expenses will be universally utilized. Measures to increase the wages of worker supervisors of construction-installation organizations, in the volume of work of which technical reequipping and reconstruction comprise 50 percent or more, have also been provided. The procedure of calculations for complete deliveries of equipment and technical documentation is being refined. Some other measures are also provided.

In order that this entire mechanism be given complete force and that all its fruits be gained, specific and clear procedural working documents are primarily necessary. Scientific workers and primarily those of our institute should carry out extensive work to prepare these documents.

But the main thing in the future is intensive work on practical implementation of an entire complex of measures planned in the decrees of the CPSU Central Committee and the USSR Council of Ministers. It is insufficient to simply recognize these measures; one must feel that they are extremely necessary. One must have them and be strictly guided by them. Moreover, one must begin today.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

SYSTEM APPROACH FOR MANAGEMENT OF THE CONSTRUCTION INDUSTRY

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 7, Jul 79 pp 21-27

[Article by Chan Chung Ngia, Candidate of Economic Sciences and deputy chief for scientific work at the Kazakh Branch of the State Scientific Research Institute of Automatic Systems for Planning and Control. "System Approach for Managing the Branch"]

[Text] For the purpose of raising the economic effectiveness of capital construction, great importance is being attached to the use of a system approach for controlling it, based upon the use of modern economic-mathematical methods, electronic computer equipment and automatic control systems.

Workers attached to the Kazakh Branch of NII sistem [Gosudarstvennyy nauchno-issledovatel'skiy institut avtomatizirovannykh sistem planirovaniya i upravleniya; State Scientific Research Institute of Automatic Systems for Planning and Control], in close contact with workers from the Capital Construction Administration of Glavrissovkhozstroy of USSR Minvodkhoz [Ministry of the Water Economy] (city of Alma-Ata) and Kazminenergo, have attempted in recent years to develop and introduce an automatic system for controlling capital construction (ASU KS).

The creation of this system has as its goal -- improving the methods employed for planning capital investments, construction-installation work and the timely placing in operation of fixed capital and production capabilities; improving the practice of periodic accounting in capital construction; raising the level of operational control over the carrying out of work at construction projects in the managements of enterprises under construction and in the main administrations and ministries.

The system includes the following interrelated complexes of tasks: 1) the formation of a draft plan for five-year, annual and quarterly capital investment plans, for construction-installation work and for the placing in operation of production capabilities and fixed capital by projects, construction projects, the managements of enterprises under construction,

economic regions (oblasts) and by department or ministry; 2) the formation of plans for planning-research work; 3) the preparation of material-technical supply plans for satisfying the requirements of capital construction (according to the nomenclature of the customer); 4) control and operational administration over the course of construction; 5) development of periodic statistical accounting in capital construction and others.

The system was developed based upon use of a DOS/Yes [dopolnitel'naya operatsionnaya sistema yedinoi sistemy EVM; additional operational system of a single electronic computer system] (version 1.3). The programs are written in the algorithm language PL/1.

The nucleus of the system is a complex of tasks for the formation of optimum plans for capital investments, construction-installation work and the placing in operation of fixed capital and production capabilities, for the ministry (department) and its subunits and for a five-year plan, a year or quarters.

The economic-organizational essence of a task for the formation of a five-year plan for capital construction consists of the following. Throughout the planned period, the ministry (department) is tasked with placing in operation a certain number of production capabilities or various types of fixed capital, required for fulfilling the plan for developing the national economy.

The following information is known for each of the projects and installations: planned capability, norm for duration of construction, stage of construction and mastering of capability and volume of capital investments and construction-installation work with a breakdown by years. Based upon the limited capital investments allocated for the ministry (department) for the planned period, a five-year plan for capital construction must be prepared for the ministry (department), from the standpoint of the construction projects, the administrations of enterprises under construction, oblasts and construction branches and in a manner such that the plan outlined will be realized with minimal expenditures while ensuring the timely placing in operation of projects and installations.

In order to carry out the established task, we developed an economic-mathematical model and a method for solving it, which satisfy the following requirements: during any planned year of the five-year plan, it is possible to have at one's disposal the active capabilities and fixed capital required for developing the national economy; to place projects and capabilities in operation on a regular basis throughout the course of the five-year plan; to reduce (within technically permissible limits for the particular planned period) the volume of unfinished construction; to create the required complex inventories in construction; to ensure a balance in capital investments between the productive and non-productive capital and within them -- by individual branches and economic regions (oblasts); to ensure coordination of the capital construction tasks outlined in the plan with the

true potential of the contracting construction-installation organizations and financial and labor resources and also to take into account a number of factors and local conditions affecting fulfillment of the plan (factors such as natural-climatic conditions and others).

The minimal reduced expenditures for capital investments serve as the criterion for optimum plan conditions for capital construction in the given instance.

For solving the given task on an electronic computer, use was made of a package of applied programs of linear programming (PPP-LP), developed at NII sistem.

The following documents were used as incoming operational information:

...capital investment limits for the five-year plan with a breakdown by years;

...control figures for mastering production capabilities, for the placing in operation of fixed capital, for carrying out the volumes of construction-installation work, for unfinished construction and readiness of the construction inventory, for the inventory of capabilities for each branch;

...availability of material and labor resources;

...information on carry-over projects (name and code of construction project, project, code of branch, code of region, norm for duration of construction, year in which construction commenced, estimated cost, including for construction-installation work, balance of estimated cost at beginning of planned five-year plan, code of contractor);

...information on newly begun projects (name and code of construction project and project, code of branch, code of region, norm for duration of construction, estimated cost, including for construction-installation work, cost of fixed capital, current expenses for the production of goods (total and coefficients for distribution by construction years), code of general contractor);

...handbook on proper proportions for capital investments by branches;

...handbook on expenditures of material and labor resources for the construction of projects (name and code of construction project and project, code of branch, code of region, name and code of resource, amount of resource (total and coefficients for its distribution by years of construction).

In addition, during the course of solving this task, use was made of the following NSI (normativno-spravochnaya informatsiya, normative-reference information: handbooks on names of construction projects and projects;

construction branches; rayons, oblasts; managements of enterprises under construction; general contractors; capabilities and units for measuring them; norms for mentioned one-time expenditures.

As a result of having solved this task, the following documents were printed and distributed (from an electronic computer):

1. List of construction projects and projects included in the five-year plan for capital construction. This list included the names of the construction projects, projects, their locations, the norm for the duration and the year for the commencement and completion of construction; the planned capability in the appropriate units of measurement, estimated cost, capital investments, construction-installation work, capability placed in operation, fixed capital, unfinished construction (total and by years of the five-year plan), name of contractual organization.
2. Five-year plan for capital construction by branches. This document contains the following indices: name of oblast (economic rayon), name of management of enterprises under construction and also construction projects and projects, norm for the duration and year for the commencement and completion of construction, planned capability in the appropriate units of measurement, estimated cost, balance of estimated limit (for carry-over projects), capital investments, construction-installation work, placing of fixed capital and capabilities in operation, unfinished construction (total and by years of the five-year plan), name of contractual organization.
3. Five-year plan for capital construction by management of enterprises under construction includes the following data: name of oblast (economic rayon), branches, construction projects, projects, norm for duration and year of commencement and completion of construction, estimated cost, including capital investments, construction-installation work, placing in operation of fixed capital and capabilities, unfinished construction (total and by years of the five-year plan), name of contractual organization.

Similar documents are produced from an electronic computer for each general contractor and each oblast (economic rayon).

The five-year plan prepared using this method, following proper coordination and approval, becomes the working plan for both the ministry(department)-customer and the contractor.

Another and equally important element in this system is the task of forming an optimum annual plan for capital construction, with a breakdown by quarters.

The initial information for solving the task consists of indices approved (or corrected) in the five-year tasks for capital construction for each construction project, management of enterprises under construction, department and ministry (branch) and also data associated with the course of

economic development, with changes in material and labor resources and with over-fulfillment of the plan for capital investments, construction-installation work and the placing in operation of fixed capital and capabilities during the year preceeding the one being planned.

The task of composing an optimum annual plan for capital construction for a ministry (department) and its subunits is formed in the following manner: based upon annual and limited capital investments allocated by a higher organ to the ministry (department) for the year being planned, a list of carry-over projects, including priority and newly begun projects, the availability of material and labor resources which the customer and contractor have at their disposal during the year being planned and the actual or anticipated status of fulfillment of the indices for the capital construction plan for the end of the year preceeding the one being planned, for a project, construction project, management of enterprises under construction or ministry (department), an annual plan (with a breakdown by quarters) is composed for the ministry (department) from the standpoint of its subunits and projects and construction projects, in a manner such as to ensure the timely placing in operation of production capabilities and projects through a concentration of capital investments on priority and carry-over projects and the creation of the required optimum complex inventories at newly begun projects.

One of the following methods can be employed for solving the established task. The first method is as follows: at the end of each year preceeding the one being planned, the five-year plan for capital construction is reappraised (in accordance with an economic-mathematical model of the task for forming the five-year plan, as mentioned above) using new data obtained during the course of fulfilling the plan for capital investments, construction-installation work and the placing in operation of fixed capital and capabilities during each year preceeding the one being planned and also during the course of economic development for the country and changes taking place in material and labor resources.

Thereafter, based upon the results of computations, a capital construction plan is formed for each year of the remaining years of the five-year plan.

Experience has shown that this method is extremely effective when used in those instances where the value describing the degree of deviation between the actual and planned data for a project, construction project, management of an enterprise under construction or ministry (department) is not too great and the five-year plan for capital construction, with a breakdown by years, is not subject to frequent corrections.

If this is not the case, then another method must be employed, the essence of which is as follows: a digital rating for the purposes of rank (degree of importance for including a construction project or project in a plan) is assigned to each construction project or project. The assignment of a digital rating (priority) to construction projects or projects is carried

out by a group of experts in the following manner: for construction projects and projects the erection of which is of decisive importance to the country's socio-economic development, digital values of priority equal to 11, 10 and 9 are assigned respectively to priority, carry-over or newly begun construction projects and projects.

For construction projects and projects the erection of which is of importance for the development of an individual branch, digital values equal to 8, 7, 6... 2, 1 are assigned respectively, depending upon the following categories: priority construction projects, projects and complexes, united by continuous technological processes; modernization and expansion of existing enterprises; priority construction projects, projects and complexes having autonomous technological processes; carry-over construction projects, priority complexes having continuous technological processes; carry-over projects for the modernization and expansion of existing enterprises; carry over construction projects in which the placing in operation of priority complexes is associated with autonomous technological processes; the more important of newly begun construction projects and projects; the remaining newly begun construction projects and projects.

For the purpose of carrying out the task of preparing an optimum annual plan for capital construction on an electronic computer, we developed an economic-mathematical model and a method for solving it which made it possible to satisfy the following requirements: to concentrate the capital investments and resources on the priority and more important construction projects and projects (criterion for optimum plan conditions); to determine the volumes of capital investments, construction-installation work and fixed capital and capabilities placed in operation, in conformity with the maximum and minimum limits imposed by the technological potential involved in the erection of each construction project and project during the planned year; to observe the principle of proportionality -- a balance for capital investments in the various branches of construction and within them -- for individual rayons and oblasts; to ensure close coordination of the capital construction tasks outlined in the annual plan with the limit placed on capital investments and with the material and labor resources placed at the disposal of the customers and contractors during the year being planned; to create complete and optimum tasks in terms of capability; to reduce the volumes of unfinished construction; to take into account proposals made by the contractor, a number of factors and specific local conditions, such as the natural-climatic conditions and others, affecting the carrying out of the construction-installation work, during distribution of the annual plan for capital construction by quarters and so forth.

The initial operational documents of the task for an annual optimum plan for capital construction, with a breakdown by quarters, include:

...capital investment limits for the year being planned;

...information on the carry-over construction projects and projects (name and code of construction project and project, code of branch, code of rayon,

estimated cost, remainder of estimated cost at beginning of year being planned, including for capital investments, construction-installation work, fixed capital, capabilities, unfinished construction for the year and month at the beginning and upon the completion of construction, code of contractor, code of management of enterprises under construction);

...information on new construction projects and projects (name and code of construction project and project, code of rayon, code of branch, estimated cost, capital investments, construction-installation work, fixed capital, capability (total and by years), code of contractor and customer);

...handbook of expenditures for material and labor resources for the construction of projects (name and code of project, name and code of resource, norm for expenditure of resource, total and by years);

...control figures for the mastering of production capabilities, fixed capital, carrying out of volume of construction-installation work, unfinished construction, readiness of construction inventory and capability inventory for each branch;

...handbook on availability of material and labor resources;

...handbook on proportionality of capital investments by branches;

...handbook on coefficient for the breakdown of the annual plan for capital investments and construction-installation work by quarters (name and code of oblast (rayon), name and code of branch, coefficients for a breakdown of the annual plan for capital investments and construction-installation work by quarters, for a number of years preceding the one being planned).

The normative-reference information for the given task includes the same mass data used in solving the task for long-range planning.

The output information for the given task includes the tabulated forms mentioned below.

List of construction projects and projects included in the capital construction plan for the ministry (department) for the year being planned. The following indices are included in this document: name of construction project, name of project and expenditures (capabilities, fixed capital, capital investments, construction-installation work, unfinished construction), year and month of commencement of construction, remainder of estimated cost at beginning of year being planned, plan for year being planned, remainder of estimated cost at beginning of year following the one being planned, draft plan for the year following the one being planned.

The quarterly indices are also indicated here for the capital investments, construction-installation work, production capabilities, fixed capital and unfinished construction, for each project and for both the customers and contractors participating in the erection of the projects.

Intra-building title list for the year being planned (using Form No. 1, approved by the USSR Council of Ministers), the contents of which include: the name of the project and expenditures; year and month of commencement of construction, estimated cost (total, including construction-installation work, equipment); remainder of estimated limit at beginning of year being planned (total and including construction-installation work, equipment); annual work plan (total and including construction-installation work, equipment); volume of capital investments for independent builder (total and including construction-installation work, equipment); volume of capital investments for the general contractor (the following information is furnished here: volume of unfinished production by projects, computations for which are carried out for the project on the whole and by stages at both the beginning and end of the year and also a change in the volume of unfinished production); the placing in operation of capabilities and fixed capital (the following information is furnished here: capabilities placed in operation, units and machines, units of measurement, amount and estimated cost of fixed capital placed in operation), period for placing capabilities in operation, computational method for construction-installation work.

Comparison of draft plan against control figures. The following data is contained in the document: capital investments (draft plan, control figures, deviation of the draft plan from the control figures); construction-installation work (draft plan, control figures, deviation of the draft plan from the control figures); placing in operation of fixed capital (draft plan, control figures, deviation of the draft plan from the control figures); placing of capabilities in operation (draft plan, control figures, deviation of draft plan from control figures).

The capital construction plan for a ministry (department), for the year being planned, includes the following indices: name of branch, oblast, management of enterprises under construction, construction project or project, year and month of commencement and completion of construction, capabilities, estimated cost, capital investments, construction-installation work, fixed capital, remainder of estimated cost at beginning of year being planned, annual plan with a breakdown by quarters (capital investments, construction-installation work, equipment, capabilities), unfinished construction at beginning and end of year, change in its volume.

The mentioned document is issued for each branch, each oblast, the management of enterprises under construction and also for each general contractor.

Form No. 7, approved by the USSR Council of Ministers, for presentation to an office, branch or agency of Gosbank or USSR Stroybank, by capital investment sections and for the placing in operation of fixed capital and capabilities. This document contains the following indices: name of main administrations, branches, capital investments, construction-installation work, change in the volume of unfinished construction, volume of capital investments and construction-installation work by projects of a productive

or non-productive nature, period for placing fixed capital and capabilities in operation and also estimated cost of project, including projects of a productive or non-productive nature.

The results obtained from solving the task of forming an annual plan for capital construction for a ministry or the management of enterprises under construction, from the standpoint of construction projects and projects, also serve as the input information for solving a complex of tasks concerned with control and operational administration over the course of construction, tasks which provide the leadership of the interested subunits with the following types of operational information:

...reports on the status of construction-installation work at a project or construction project during a given period of time, which contain data on the carrying out of construction-installation work, on the forecast periods for completion, on the actual or forecast deviations of the beginning or completion of work from the planned schedules and on the reasons for such deviations;

...reports on deliveries of equipment and special materials, which are used for accounting and control purposes for material-technical support deliveries. They contain a list of the nomenclature of deliveries ordered, shipped, obtained or delivered for installation during the planned period. In addition, they furnish information on a disparity between the network graph for the delivery plan and the forecast deliveries of equipment and special materials for a project;

...reports on the obtaining of planning-estimates documentation, which contain a list of technical documents which either arrive late or contain deviations in the work volumes.

The system underwent experimental testing at Glavriassovkhozstroy of USSR Minvodka (city of Alma-Ata) in 1977 and in 1978 it was accepted by the state committee for industrial use.

It is presently being introduced into operations in Kazminenergo. In the near future it will be placed in operation in Kazglavvodstroy of the republic's Minvodka, in Glavdal'vodstroy of the USSR Minvodka (city of Vladivostok), in USSR Mintsvetmet [Ministry of Nonferrous Metallurgy] and in the Kazakh SSR.

Experience has shown that this system ensures the development of optimum variants for a capital investment plan, for construction-installation work and for the placing of fixed capital and capabilities in operation, variants that are coordinated in terms of interrelated indices. In addition, opportunities appear for having operational reports on the course of construction and deliveries of construction materials and equipment and on the presentation of the technical documentation required by the leadership

of a ministry (department), for making a decision based upon a thorough analysis of information obtained from an electronic computer.

Equally important is the fact that the planning workers of the ministry (department), the main administrations and their subunits are released from having to perform non-creative work, since considerable volumes of work concerned with the collection, accumulation and processing of information are being carried out on electronic computers and other office equipment.

The annual economic effectiveness of the system ranges from 500,000 rubles to 1.2 million rubles (depending upon the volumes of capital investments of 400 - 1,000 million rubles respectively), as a result of accelerated schedules for the erection of projects, for reducing the volume of unfinished construction and the rational use of material and labor resources.

An analysis of the results of the practical introduction of the system has shown that it can be employed with great economic effectiveness practically in all ministries, departments and organizations engaged in the planning and administering of capital construction and which perform in the role of customers.

In the construction ministries, main administrations and their subunits, the system can be used for the planning and administering of internal capital construction.

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RURAL CONSTRUCTION INDUSTRY IN THE BAM ZONE ZONE

Муров ВЕЛ'СОВЕ СТРОИТЕЛ'СТВО В РАЙОНЕ БАМ (1974) 11-12

[Article by M. Litovskiy and A. Guseva, translated in economics: "Rural Construction Industry in the BAM (Bajkal-Amur Bayr. Railroad) Construction Zone"]

[Text] The pace of construction in the BAM (Bajkal-Amur Bayr. Railroad) is constantly being stepped up. The builders are laying the steel track further and further; they are building bridges, tunnels, power-transmission lines, railroad stations, housing settlements with modern picture theaters, stores, and other facilities which are so necessary for life under the severe conditions of Siberia and the Far East.

In the 10th Five-Year Plan one of the most important tasks of the interkolkhoz construction organizations of Irkutskaya, Chitinskaya, and Khabarovskaya Oblasts, as well as those of the Buryatskaya and Yakutskaya ASSR's, through whose territory the BAM is being laid, is the creation of a strong, highly mechanized production base.

In Irkutskaya Oblast the groups of the interkolkhoz construction organizations will build an SSK [rural construction combine] with an annual capacity of 10,000 cu. m of precast reinforced concrete, or 10 complexes of farm production buildings, as well as an open-pit quarry with a crushing and grading plant in the city of Mikhaylovskaya with an annual capacity of 120,000 cu. m of crushed stone and a brickyard in the city of Cherskaya with an annual capacity of 10 million bricks.

The construction of an SSK with the same capacity in the settlement of Zherlovaya Gora, Chitinskaya Oblast is already nearing completion. Created here have been a plant producing keramzit gravel with an annual capacity of 100,000 cu. m and an open-pit quarry with an annual capacity of 200,000 cu. m of gravel. A brickyard has been put into operation in the settlement of Zherlovaya, designed for an annual output of 20 million bricks.

In Irkutskaya Oblast capacities are being developed for a combine to produce building materials and structural components at the rate of 50,000 cu. m annually, as well as an inter-oblast machinery and repair plant. Construction is nearing completion on a house-building combine.

Plans have been made to erect a rural construction combine in the settlement of Kyt-Basty, Yakutskaya ASSR. A plant producing reinforced concrete items with a capacity of 75,000 cu. m and a plant turning out keramzit gravel with a capacity of 50,000 cu. m are being erected in the settlement of Kamensk, Kuryatskaya ASSR.

The creation of a powerful production base consisting of the enterprises mentioned will enable rural builders in the BAM regions to ensure the fulfillment of construction and installation work on kolхозes and Sovkhozob in an amount worth approximately R500 million.

Ussuriysk Oblast may serve as a positive example of rapid growth in the volume of construction and installation work. The putting of an SSK into operation has allowed the association to effect an almost 4-fold increase in the volume of its work over 3 years of the 10th Five-Year Plan. The beginning of the creation of this major industrial complex was laid by the construction of a reinforced-concrete product plant within a complex with an enterprise producing keramzit gravel with a capacity of 100,000 cu. m annually. Then, on the same site, the following were created: administrations for the mechanization of construction operations (UMSR), engineering outfitting (UPTK), and a lumber-milling combine, designed for an annual production of 125,000 sq. m of carpentry products. Also set up here in an eight-span building wing was an integrated enterprise, concentrating within itself the production of electrical installation and sanitary-engineering products, various fittings, metal structural elements, and optional equipment. Moreover, an automotive enterprise with 600 motor vehicles was organized on the territory of this SSK, along with three specialized PMS's (not further identified), engaged in sanitary-engineering, special, and road-construction work. In sum, a major new industrial-construction complex has arisen.

The putting into operation of this SSK enables people to organize with the least possible expenditures the outfitting with ready-made structural components of construction projects involving farm-production, social-cultural, and everyday services. At present the enterprise turns out standardized, reinforced-concrete structural components and parts, from which any projects may be assembled. The degree of prefabrication of such buildings and structures is more than 90 percent. For all practical purposes, only their installation takes place at the construction site. Technical-economic factors have established that the cost of building an SSK should be recouped within 5 years. However, practical experience here indicates that this period will be shortened to 3 years.

In the zone of BAM's operation most of the SSK's are being created as specialized (in erecting production buildings, apartment houses, schools,

children's institutions, etc.) as well as complex (a combination of production, residential, and cultural-everyday-life buildings), and this allows the assurance of erecting rural buildings of various types.

The classification of interrelated BAM areas is made using several criteria, as shown in Figure 1.

Expansion and consolidation of the network of rural construction and housing building combined will become the basis for the further spread of production-planning-and-construction associations which will be able to ensure the continuous investment program of rural construction in the BAM region.

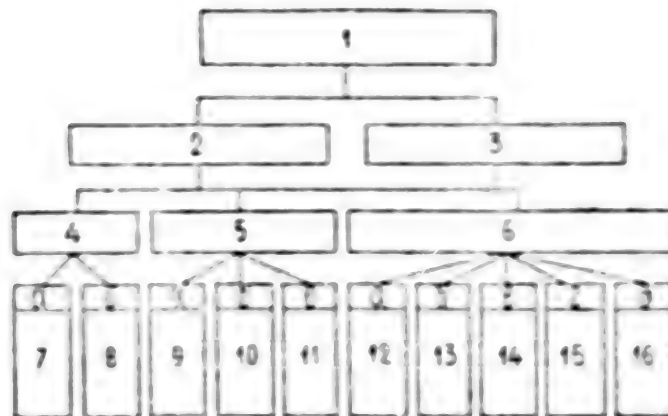


Figure 1.

- | | |
|---|--|
| 1. New | 11. Integrated engineering process in industrial construction |
| 2. Specialized | 12. Production farm buildings based on reinforced concrete and lightweight concrete structural components |
| 3. Complex | 13. Residential and cultural-everyday service buildings using a predominance of concrete and reinforced concrete products |
| 4. Jurisdictional independence | 14. Industrial buildings with protective walls made of asbestos-cement, aluminum structural components and effective heat insulation |
| 5. Nature of production base | 15. Apartment houses based on wood-fiber panels and effective heat insulation |
| 6. Products list, Types a, b, v, p, d | 16. Large-block apartment houses using reinforced concrete |
| 7. Operates on independent balance sheet | |
| 8. Industrial sphere on industrial balance sheet, construction sphere on construction balance sheet | |
| 9. Output of complete sets for production, housing, and cultural-everyday service construction is carried out by means of UPTK | |
| 10. Plants united to produce complete sets of farm buildings and construction-installation organizations, erecting no more than 75 percent by their own efforts | |

In creating such associations--an integrated service of all participants--it is expedient to include in their composition planning and contracting construction and specialized organizations, subunits engaged in building roads and municipal-service facilities, transportation, management of mechanization and production-engineering equipment, construction combines engaged in producing complete sets of structural components for farm complexes, residential and other buildings and structures, as well as industrial enterprises engaged in manufacturing structural components, products, and building materials.

The advantages of such an organization of construction are indisputable: the financial security of rural construction is improved, optimal mutual relationships are established between partners, their cooperation is reinforced at a high degree of motivation in carrying out plan decisions and finding ways to implement them. Within such a form of managing construction all services will be able to take part directly in the over-all flow of construction production.

In sum, the possibility is opening up for an accelerated pace of satisfying the growing needs for construction in the BAM regions and the development of the natural resources of this large region.

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CSO: 1821

CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

EXPERIMENT IN CONSTRUCTION OPERATIONS IN BELORUSSIAN SSR REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 79 pp 8-9

[Article by Yu. Rakhmanov, chief of the Main Planning-Economic Administration of USSR Ministry of Industrial Construction: "According To Commodity Construction Production"]

[Text] In the decisions handed down by the party and government concerning improvements in the economic mechanism, measures were outlined for accelerating the placing in operation of production capabilities and projects and raising the effectiveness of capital investments. The construction organizations of Minpromstroy [Ministry of Industrial Construction] for the Belorussian SSR have accumulated definite experience in solving these tasks. An experiment has been in progress here since the beginning of the five-year plan, the purpose of which has been to reduce the schedules and accelerate the placing in operation of capabilities and projects, raise the concentration of construction and reduce the number of projects being erected simultaneously and also the volume of unfinished construction. In addition, tasks have been assigned for raising the culture of construction production, creating the prerequisites for converting over to the flow line form for organizing construction operations and for raising the quality of work.

Essence of the Experiment

A change in the method of planning and the conversion over to evaluations based upon new indices have promoted solutions for the mentioned problems. One such index is the index for commodity construction production. It is computed based upon the estimated cost for construction-installation work, for enterprises, phases, priority complexes and projects which have been delivered to the customers and which are ready to produce goods and for the rendering of services.

An evaluation of the work of organizations, the formation of profit, contributions to the economic incentive funds and the issuing of funds for wages are carried out depending upon fulfillment of the plan for commodity

construction production. This criterion has become the basis for an agreement and it is coordinated with the schedules for placing capabilities in operation and with all of the quality indices of a plan.

The conditions established for the experiment called for continuous 2-year planning. The introduction of such a system should have promoted the elimination of shortcomings associated with unsatisfactory organizational preparations for construction production. The untimely presentation of technical documentation, delays in the allotting of sectors, lack of coordination for the schedules for equipment production and deliveries and late schedules for the opening of financing and concluding of agreements in many instances lead to disruptions in the construction production technology, to carrying out work on a rush basis and to failure to place capabilities in operation. In the interest of creating conditions for the earlier preparation of all those participating in the erection of new capabilities and projects, an annual working-up of a 2-year plan for placing in operation projects of both a production and non-production nature was introduced on an experimental basis.

The experiment also touched upon improvements in planning the technological inventory. In order to create a definite rhythm in construction production, Minpromstroy for the Belorussian SSR was authorized, during the coordination of title lists for construction projects, to distribute the work volumes by years of construction (within the limits of an overall normative period of duration) based upon the conditions for creating the required technological inventory and a more rational distribution and use of resources.

A change also took place in the system for financing expenditures for unfinished construction production. Instead of advances by the customers (non-interest allotment of temporary working capital), the expenditures of construction organizations for unfinished production are covered by bank credit presented prior to the actual period for turning the projects over for operation. Differentiated payment percentages were established for the use of loans: for ahead-of-schedule delivery -- lowered and when the schedules for placing capabilities in operation are not met -- raised.

During the course of the experiment, the conversion over to complete economic accountability was carried out. Distinct from the established system, the principal source for covering all of the expenditures of the construction organizations of Minpromstroy for the Belorussian SSR is that profit left at the disposal of the ministry in accordance with the established norm. The amount of payments into the budget is determined taking into account this norm in the financial plan. In those instances where the funds left at the disposal of the ministry are not used prior to the end of the year, they are not withdrawn but rather they are used for covering next year's expenses. To a large degree, this system makes the construction organizations dependent upon fulfillment of the plans for placing projects and capabilities in operation, upon the volume of commodity construction output produced and upon profit.

Stimuli of Effectiveness

Improvements were carried out in the system of economic incentives. The amount of the funds began to be determined based upon norms approved by USSR Minpromstroy, by agreement with the central committee of the professional trade union and for the ministry on the whole. The system for the formation and use of economic incentive funds in construction organizations remained basically unchanged. One new development -- the local organizations began transferring up to 12 percent from each fund into the centralized funds of the ministry.

The centralized funds are used for technical re-equipping and modernization, the construction of housing and cultural-domestic projects, material incentives for subunit workers for having carried out especially important special purpose tasks, rendering assistance to construction organizations and also for issuing material incentives to workers attached to the central apparatus of the ministry and its non-production subunits.

The expenditures for maintaining the administrative apparatus of the republic's Minpromstroy are carried out in accordance with the norm and at the rate for 1 million rubles worth of construction-installation work. The norm is approved by USSR Minpromstroy by agreement with the USSR Ministry of Finances.

Considerable attention was given to reviewing and coordinating, with the customers, the technical conditions for planning the buildings and installations and for accepting and checking upon the quality of the planning-estimates documentation. The system for furnishing support for construction in the form of material-technical resources, through the organs of Gosnab of the Council of Ministers for the Belorussian SSR, was reorganized, with the specialized Belpromstroy Snabsbyt Administration being created as part of Gosnab. In this regard, Glavnab [Main Supply Administration] of Minpromstroy for the Belorussian SSR was abolished. At the same time, the Stroykomplekt Trust, which was responsible for the planning, control and accounting for complete deliveries of machine building products, precast reinforced concrete and metal structures, was expanded.

Measures were implemented aimed at developing the internal production base and some changes were carried out in the functions of subunits of the ministry's central apparatus. A normative base was created for the use of electronic computers in planning and accounting.

Initial Results

All of these factors enabled Minpromstroy for the Belorussian SSR, despite a number of difficulties that arose, to achieve definite positive results. Over a period of 3 years, 2,642 production capabilities and projects were placed in operation, of which number 176 were activated in accordance with the national economic plan. Moreover, 200 capabilities were placed in

operation ahead of schedule, including 15 in connection with the national economic plan. Among these were: the first phase of a plant for protein-vitamin concentrates (city of Polotsk) with a capability of 60,000 tons and the Vitebsk Limestone Flour Plant with its capability of 1.32 million tons. At the Minsk Worsted Combine, capabilities were placed in operation for producing 28 million square meters of finished fabric, new capabilities for producing trucks and spare parts were built and placed in operation at the Belorusskiy Motor Vehicle Plant in the city of Zhodino and a number of other facilities were placed in operation. The construction organizations succeeded in coping fully with the plan for placing schools, pre-school institutes, polyclinics and hospitals in operation. During the 3 year period, 6.44 million square meters of living space were placed in operation, a greater amount than the figure called for in the planning task.

The majority of the construction-installation organizations fulfilled their plans for placing production capabilities and projects in operation. Compared to the plan, the construction schedules for 776 projects were reduced. Moreover, the average duration of construction for the projects in 1978 decreased by 5.7 percent compared to 1977 and during the 3 years -- by 16 percent.

In 1978 the placing of fixed capital in operation for the customers, according to data supplied by Minpromstroy for the Belorussian SSR, increased by 27.4 percent compared to 1975. More than 2.5 billion rubles worth of commodity construction output was produced. The level of unfinished construction production, according to the summary balance for a contractor and customer (in percentages of the volume of construction-installation work) decreased by 3.6 points. The quality of the construction work improved considerably. In 1978, 96.5 percent of the industrial projects were turned over to the customers with evaluations of "very good" or "excellent."

Role of Economic Levers

The mechanism established during the experiment for distributing profits between the ministry and state budget, in accordance with stable norms, has become a most important component part of the economic methods of control. In the recent past, Minpromstroy for the Belorussian SSR has carried out a considerable amount of work in connection with searching for more effective methods for utilizing the monetary resources of construction organizations and industrial enterprises and it has intensified control over the use of resources for special purposes.

The construction organizations are devoting greater attention to those problems concerned with raising labor productivity and production profitability and more effort is being directed towards introducing new equipment and leading experience into production operations. During the three year period, the economic effect realized from the introduction of new equipment measures amounted to 49.3 million rubles. Compared to the overall

volume of construction-installation work carried out, the level of completely pre-fabricated construction reached 74.5 percent. Considerable attention was given to strengthening lower level economic accountability. In 1978, more than 70 percent of the work volume was carried out using the brigade contract method (in 1975 -- 41.9 percent).

However, experience over the past 3 years has shown that some of the conditions of the experiment were not observed fully. During the course of carrying out the experiment, serious difficulties and shortcomings arose which prevented the construction organizations from achieving higher results.

During the formation of the plan for the Tenth Five-Year Plan, the majority of the ministries and department-customers did not adopt the proposals of Minpromstroy for the Belorussian SSR regarding the volumes of construction-installation work for the 1976-1980 period and, as a result, the rates of growth for the volume of construction-installation work, by years of the five-year plan, were determined for the ministry in a very irregular manner and they were changed in the annual plans.

Until recently, no success had been achieved in creating a unified system for planning commodity construction production for Minpromstroy for the Belorussian SSR and its customers. The plan for commodity construction production is still being developed and approved on a unilateral basis -- only for contracting organizations. Just as in the past, the overall volume of construction-installation work is established for the customers in the plan for capital investments.

No success was achieved in obtaining a uniform distribution of the plan for placing capabilities and projects in operation or for the volume of commodity construction production by quarters of the year. As a rule, more than 80 percent of the plan for placing commodity construction production in operation is carried out during the second half of the year.

This explains why the builders adopted with such enthusiasm the resolution of the CPSU Central Committee and the USSR Council of Ministers entitled "Improvements in Planning and Intensification of the Effect of the Economic Mechanism With Regard To Raising Production Effectiveness and the Quality of Work." This resolution furnished a solution for those problems which surfaced during the course of our experiment. And now a great amount of organizational work is required on the part of all construction and industry elements, in the interest of ensuring that these effective measures are properly implemented.

7026

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IMPROVED PLANNING OF FINAL RESULTS OF CONSTRUCTION ORGANIZATION ACTIVITY

Moscow ZHELISHCHNOYE STROITEL'STVO in Russian No 8, 1979 pp 10-12

[Article by E.I. Safonova, Candidate of Economic Sciences: "Improvements in Planning the Final Results of Construction Organization Activity"]

[Text] The investment process -- the process of carrying out capital investments under conditions involving the planning and evaluation of activity based upon commodity construction production -- embraces many participants, of which two of the principal contractors are the customer and the general contractor. The remaining participants (planners, suppliers, transport workers, institutes of Stroybank [All-Union Bank for the Financing of Capital Investments]) ensure the conditions required for carrying out the process. The effectiveness of the conditions is based upon maximum observance of the contractual obligations, which in turn define the nomenclature of the output, its quality in conformity with the plan and the schedules for carrying out the work.

The requirements with regard to the final results are defined by the customer, who represents the national economic interests, and he does this by agreement with the general contractor, who represents the economic accountability interests.

At the present time, the merging of the national economic and economic accountability interests is a principal condition for ensuring effective management. The integration of the interests of the customers, contractors and others participating in the investment process must be expressed through a system of interrelated indices.

The principal index for the merging together of the national economic interests and economic accountability interests of those participating in the investment process, the degree and duration of participation of which vary, is the index for the placing in operation of production capabilities and projects.

The responsibility for placing the production capabilities and projects in operation is essentially borne by the same contractual construction-installation organizations.

However, the activities of contractual organizations represent both the principal and final stage in the capital investment process. It is preceded and accompanied by the work of the customers, planning organizations, suppliers, transport organizations and the institutes of Stroybank. The sources for the formation of the effectiveness of this process are to be found in the sphere of activity by a customer and they are associated mainly with rational planning of the volumes of capital investments and their distribution by years, considered to be adequate for ensuring the placing in operation of the planned priority complexes, phases, enterprises and projects and also with planning of the branch, reproductive and technological structure, taking into account the time factor, validating the more economical plans and the timely placement of orders for equipment and complete equipment deliveries, planning the real sources of financing and the timely transfer of funds, made available in connection with the conversion over to accounts with no intermediate payments (to special bank accounts). The conversion over to accounts with the customers for priority complexes, phases and projects placed in operation required a reorganization of the activities of the planning organizations, which must develop technical documentation with an apportionment of the priority complexes and phases and the estimated expenses for them such that the contractual construction-installation organizations, prior to the commencement of construction, could distribute in a rational manner the workload for their capabilities and ensure the most complete utilization of resources.

The unfounded apportionment of priority complexes during the construction process is associated as a rule with the need for recomputing estimates and this leads to a delay in the transfer of funds by the customer and to an increase in the percentage rate for the use of credit.

The planning organizations bear responsibility for the timely and complete development of the planning-estimates documentation for a priority complex, phase or project, with quality being taken into account.

Low quality estimates (failure to consider certain work in the estimates, unsound determination of the composition of priority complexes and so forth) lead subsequently to a redistribution of funds and, as a result, to a disruption in the schedules for the delivery of projects. This adversely affects not only the production-economic activity of the contractors but also the overall national economic results.

This is in conflict with the economic accountability principles of management, particularly at the present time when there is a very definite trend towards expanding economic accountability relationships not only vertically (by levels of control) but also horizontally -- among all participants in the planning-construction conveyor line linked by contractual obligations. Each of these elements must bear material responsibility for their non-fulfillment.

Similar requirements are imposed on the remaining participants in the investment process. The system of computations and evaluations of the work

of sub-contracting organizations, suppliers of equipment and materials and transport organizations must also be oriented towards the final results of their activities, while carrying out the required complexes of work on priority complexes, phases or projects that have been completed and are about to be delivered to the customers. The computations with the suppliers and transport organizations must be carried out on the basis of "complete units."

Hence, improvements in the economic methods of control must affect the sphere of activity not only of the contractor, as has been the case up until now, but also all other participants.

In this regard, special importance is being attached to solving the problem concerned with establishing a single and interrelated system of indices for planning and evaluating the work of contractors, customers and planners, oriented towards priority complexes, phases and projects, prepared for the production of goods or the rendering of services.

Unity in the planning and evaluation of the work of contractors and customers must be expressed in terms of the principal evaluative index for fulfillment of the plan for capital construction of the customers, similar to the plan for contractual work, must be the index for the placing in operation of production capabilities and projects in natural terms. The estimated value of the fixed capital must conform to it. Thus the customers, being the starting element in the capital investment process, will complete it on a par with the contractual organizations and with all of the ensuing consequences. The customer, motivated not by utilization of the greatest volume of capital investments but rather by fulfillment of the plan for placing capabilities in operation, is obligated to take into account the requirements for concentrating resources on a limited number of projects being erected simultaneously and to apply himself in a more responsible manner to the distribution of capital investments during the formation of priority complexes. In the process, great importance must be attached to sound rates of development: the placing in operation of production capabilities and projects must surpass the growth in capital investment volumes.

The economic accountability interests of the contractors require that the distribution of the volumes of construction-installation work by years be carried out not by the customers but rather by the contractors, as the direct actuating agents, based upon the need for continuous and uniform workloads for the capabilities, for ensuring the rhythmic placing in operation of projects and also for the creation on this basis of a technologically necessary and economically feasible inventory.

However, it bears mentioning that the effectiveness of the production-economic activity of contractual construction-installation organizations, under conditions involving the planning and evaluation of activity based upon commodity construction production, is dependent to a substantial degree

upon the uniformity of distribution not of the volumes of construction-installation work but rather of the plan for placing projects in operation according to individual planned periods.

Under conditions involving an evaluation of the gross volume of work, the rhythmic nature of the work is mainly characterized by a distribution by quarters or other periods of the overall estimated cost of the construction-installation work. Under the new conditions, a project becomes the principal planning-accounting and computational unit and the rhythmic nature of construction production must be characterized by a planned distribution for the placing in operation of production capabilities and projects by quarters and, as a derivative of the plan for placing capabilities in operation, corresponding to the estimated cost of the construction-installation work carried out at the capabilities and projects placed in operation (commodity construction production). In housing construction, especially standard construction, the task of uniform distribution for the placing of capabilities in operation is being solved through the formation of long-term flows based upon continuous planning. In industrial and other types of construction and owing to the specific nature of the production work, the rhythmic nature of the work may be characterized, as indicated above, by as "systematic" distribution for the placing of capabilities in operation, that is, by a distribution which, while reflecting a maximum possible uniformity in the plan, takes into account the inevitable lack of uniformity. Rhythmic work in these instances is characterized by the relationship between the actual and planned coefficients of uniformity.

The task concerned with the systematic distribution of the placing in operation of production capabilities and projects can be solved mainly within the system of the contractor, taking into account the approved schedules for placing them in operation and by agreement with the customer. The interests of the contractor must necessarily be taken into account in the process, since the formation of profit and the economic incentive funds and the stability of the financial status of the contractor are directly dependent upon realization of the plan for placing projects and capabilities in operation.

Hence, the formation of calendar construction schedules which ensure a maximum workload for the capabilities of the construction organizations must reflect the economic accountability interests of the contractor, which must take the customer into account. Under conditions involving unilateral consideration of the interests of the customer, the economic accountability independence of the contractual elements is not realized.

For coordinating the planned capital investments and tasks concerned with the placing in operation of capabilities and projects, the plans for capital construction, just as in the case of the contractors, must call for volumes of commodity construction production formed on the basis of priority complexes consisting of a technical (technical-working) plan, allocated by the customers and planning organizations.

This is required for raising the responsibility of the customer for sound planning of capital investments in priority complexes and for balancing them with the volumes of commodity construction production, that is, with the estimated cost of construction-installation work carried out on priority complexes, phases and projects. In turn, this leads to unjustified differences in the levels of fulfillment of the plan for placing capabilities and projects in operation and the plan for commodity construction production, as the result of an unsound determination of the estimated cost for construction-installation work on priority complexes. For its part, unbalanced planning complicates the realization of the planned tasks and it lowers sharply the effectiveness of expenditures.

The system of indices, in addition to being unified and mutually linked in terms of verticals and horizontals of economic accountability relationships, must also meet the requirement for unity and agreement of the natural and cost gauges for the final products.

The natural-material structure of the production capabilities and projects placed in operation must be determined according to the nomenclature corresponding to the approved plans, title lists, plans and agreements concluded. From this standpoint, in order to strengthen the natural-material structure for placing capabilities and projects in operation, the cost gauge for this special purpose index (commodity construction production) must be the estimated cost of the construction-installation work at production capabilities and projects placed in operation, in conformity with the quality determined by the plans and estimates. This ensures a unity for the cost and natural measurement of the final result of the activity.

The index for the estimated cost of construction-installation work at production capabilities (priority complexes, phases, enterprises) and projects placed in operation differs from the experimental index at the present time for commodity construction production at a number of ministries (Minpromstroy for the Belorussian SSR, Minmontazhspestroy [Ministry of Installation and Special Construction Work] for the Belorussian SSR, USSR Minstroy [Ministry of Construction], Glavzapstroy, Minstroy for Lithuania and others); this index also includes work carried out using funds for capital repair work and for the principal activities of enterprises in conformity with the accepted system of accounts.

The index for the estimated cost of construction-installation work carried out at production capabilities and projects placed in operation, in conformity with the nomenclature defined in the title lists, plans and contractual agreements, will make it possible to determine in "pure" form the volume of completed construction output and it will ensure its adequacy for the index for placing capabilities in operation in natural terms.

Unity of the natural and cost gauge is required for the strict observance of the planned natural-material structure of projects placed in operation, for balanced production and growth in use values produced by the customers, the

structure of which reflects the natural-material structure of the index for placing capabilities and projects in operation. When this condition is observed, the volume of commodity construction production will be characterized by fulfillment of the plan for placing in operation only projects called for in the plan and agreements.

As an evaluative index and within the system for the contractor and customer, use must obviously be made of the index for commodity construction production (including the estimated cost of work performed by sub-contracting organizations) and not the volume of commodity construction production carried out using internal resources, since the latter is not associated directly with the index for placing projects and capabilities in operation and since it stimulates an increase in the volumes of work carried out by the general contractor.

At the present time, the planning for capital investment volumes must be carried out not in terms of new projects but rather on the basis of a planned increase in output, that is, primarily through the technical re-equipping, modernization and expansion of existing enterprises.

The technical-economic justification for the effectiveness of a planned reproduction structure for capital investments within a customer's system (national economic effectiveness) must be combined with the economic accountability interests of its implementation by the contractor's resources, since it is known that in those instances where production is hampered by great labor-intensiveness and complexities, the contractor will make no attempt to include modernization work in the production program for such projects. Under these conditions, planning for the placing in operation of general purpose capabilities and projects does not orient the customers or contractors towards the preferred carrying out of modernization work. The index for commodity construction production, which is not broken down according to forms for the reproduction of fixed capital, excludes the possibility of a differentiation of the norms for deductions into the economic incentive funds.

In this regard and when planning and evaluating the activities of contractual construction-installation organizations, the index for the placing in operation of production capabilities and projects in conformity with the approved estimates, title lists, plans and agreements and also its corresponding estimated cost for construction-installation work carried out during the planned period on the priority complexes, phases and projects placed in operation, must be established with a differentiation for the technical re-equipping, modernization and expansion of the new construction.

The system of incentives must take into account the structure underlying the placing in operation of capabilities and projects, the observance of its natural-material structure in conformity with the approved plan and also the quality of the production capabilities and projects placed in operation. Integration of the interests of the contractors and customers, which is based

upon unity with respect to the final goals of their activity, must be expressed also in terms of a mutually coordinated system of indices of effectiveness, a system that is oriented towards the final national economic results. A requirement exists for developing a single system of indices which describe the total economic effectiveness of the entire investment process, commencing with planning and ending with the mastering of the planned capabilities. Such an approach will make it possible to determine the contribution made by each participant towards the total economic effect realized and to balance the effect obtained against the expenditures of each one of them.

The development and use of such a system is particularly advisable under conditions involving centralization of the functions of planners, customers and contractors into a single representation and in connection with concentrated construction and continuous planning. Complex programs for raising the effectiveness of production and capital investments must become the planning documents for reflecting the indices for effectiveness and its sources. The development of complex programs must be carried out for the most part under conditions of regional-branch planning and with the formation and development of territorial-production complexes, the creation of a production base for the construction industry and the solving of other reproduction tasks.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

INTRODUCTION OF BRIGADE COST ACCOUNTING IN CONSTRUCTION IN ESTONIA REPORTED

Tallin SOVETSKAYA ESTONIYA in Russian 13 Sep 79 p 2

[Article by M. Sagach, chief of the Labor and Wage Department of the Ministry of Construction of the Estonian SSR: "Brigade Cost Accounting"]

[Text] As is known, it was determined by a decree of the CPSU Central Committee and the USSR Council of Ministers on improving the accounting mechanism that the brigade form of organization and stimulation of labor becomes basic during the 11th Five-Year Plan.

Today we relate the development of brigade cost accounting at construction projects of the republic.

Brigade cost accounting has been introduced at construction projects of our ministry since 1971 and more convincingly demonstrates with each year the advantages of this progressive form of labor organization and construction production. Conversion of brigades to the contract method increases the interest of each member of the brigade in more complete use of production reserves and contributes to formation of a communist attitude toward labor and socialist property.

First, a few figures. The number of cost-accounting brigades in the system of Minstroy [Ministry of Construction] of the Estonian SSR is increasing with each year. Whereas only two brigades of the Tallinstroy Trust operated on contract in 1971 and whereas a total of approximately 100,000 rubles' worth of construction and installation work (SMR) was completed, 305 brigades were operating by this method in 1978 and they completed 62.8 million rubles' worth or 51.4 percent of the total volume of construction-installation work, and during the first 6 months of 1979, 316 of the total number of 560 brigades engaged in brigade cost accounting completed 35.7 million rubles' worth of construction-installation work or 57 percent of the total volume. The task established by the cost-accounting brigades on the increase of labor productivity was overfulfilled by 2.5 percent and wages were increased by 20-25 percent higher than throughout the organization as a whole.

Brigades operating on contract achieved a saving of 760,000 rubles above the plan during the first 6 months due to reduction of estimated cost. As a result, they were paid a bonus totalling 96,400 rubles.

The Ministry of Construction of the Estonian SSR adopted a number of measures to introduce this progressive method in all construction organizations and also in large-panel housing construction during the Ninth and especially during the Tenth Five-Year Plans.

The experience of the collective of the Stroymekhanizatsiya Trust and also of the Narva Construction Trust on introduction of the new form of brigade cost accounting deserves attention. Introduction of the brigade method contributed to an increase of labor productivity here, to improvement in the use of mechanisms and to an increase of the shift coefficient.

We not only arranged an increase of the number of contracting brigades by the beginning of the Tenth Five-Year Plan. Simultaneously with a quantitative growth, life demanded further improvement of agreement relationships.

Since 1976 the ministry has worked out regulations on the object contract. The Tallinstroy Trust initially, later followed by the remaining construction organizations, converted from brigade contract to object contract. What did this result in and what is the difference?

We essentially encountered and survived the unsuccessful aspects which the founder of the contract Nikolay Zlobin encountered. As is known, N. Zlobin's complex brigade, consisting mainly of stonemasons and installers, took on only their own work under contract in construction of apartment buildings--bricklaying, installation of reinforced concrete structures and finishing work (plastering and painting) were completed by other brigades also working by the new method.

It is no secret that no significant saving is possible in painting work, and, consequently, a bonus here is intangible. Whereas the stonemasons and installers of reinforced concrete structures are achieving a significant saving and consequently a bonus.

In short, the finishers began to let N. Zlobin's brigade down. Although they did achieve a saving, no bonus could be obtained for this collective. And then N. Zlobin included the finishers among his brigade. And now the entire sum of the bonus received by reducing the calculated cost is supposed to be divided among all members of the brigade depending on the time worked.

We also encountered this same problem. Not only the finishers let us down, but the brigades of specialized organizations, for example, sanitary engineering, also are unable to save basic materials (radiators, pipe fittings, sanitary engineering devices and so on). The deadlines for turnover of the objects were interrupted as a result.

And then a number of leading brigade foremen advanced the idea of an object contract. The calculated bonus is divided among all brigades in proportion to the normative labor consumption of the work performed by each of them for purposes of material stimulation of all collectives working on a given object by contract and in timely introduction of it into operation (by the total of the saving achieved throughout the object as a whole). And it must be said that it worked and everyone is seemingly satisfied. But here we encountered unforeseen difficulties.

The financing organs began to record a check in their official reports: "There are violations in distribution of the bonus among brigades." Instead of calculating the bonus of each brigade by the saving which it achieved in work directly fulfilled, the bonus is divided among all brigades of the collective throughout the object as a whole. This is of course unfair. Unfortunately, it was impossible to solve the problem of distribution of the bonus received throughout the object as a whole in similar procedure and among the brigades of the subcontracting organizations, especially of the Santekhmontazh Trust, such as, for example, Tallinstroy Trust, do not have the right to recalculate the specific sums of the bonus to the Santekhmontazh Trust. We feel that this regulation is invalid. It must be changed in the interests of the matter.

Deficiencies were also revealed in the situation of the object contract during introduction of the brigade contract. As a result, the brigade did not receive a bonus for reduction of the calculated cost when the object was not introduced into operation within the deadlines provided by the agreement, but was turned over within deadlines provided by the plan, regardless of their causes. As a result the dissatisfaction of the brigades was natural and they lost interest in cost accounting in general.

In this regard, Ministry of the Estonian SSR introduced a number of amendments to the regulation on the object contract. Specifically, the deadline for introduction of an object provided by an agreement with a cost-accounting brigade can be converted within the planned deadline for introducing the object if the brigade is unable to work at the given object (let us say, due to idle time or transfer to another object, the absence of materials, planning documentation and so on). These measures strengthened confidence in the validity of the cost-accounting method.

Extensive work was carried out to convert the Tallin DSK [Home-Building Kombinat] imeni 60-Letiya Oktyabrya to the "indirect contract": shop-transport-construction project. The problem of material stimulation of all participants of construction in providing introduction of objects into operation within established deadlines was thus solved to a significant degree.

Thus, brigade cost accounting is being improved continuously, new sections are being introduced into it and as a whole the tasks of the construction organizations are being realized by conversion of the brigades to cost accounting.

Despite some success in introduction of the brigade contract, continuous improvement of it and conducting All-Union schools of leading experience on the basis of our construction organizations, unfortunately, it should be noted that the proper attention is still not being devoted to this progressive method at some construction organizations (the Tartustroy Trust and the Rural Construction Trust) and, as a result, the technical-economic indicators in fulfilling the plan are also low here.

The rather laborious task of determining the calculated cost of work is inhibiting further development of the method (a minimum of three months of engineering work is necessary for calculating a five-story apartment building). The planning organizations of the republic could render important assistance to the builders if they took part of this work on themselves and specifically determination of labor expenditures and wages broken down into types of work, and also determination of the need for materials by production norms.

Simplification of work in determining the calculated cost and mechanization of it have been discussed for years, but there are still no appreciable changes.

What should the future development of N. Zlobin's method be?

The Vinnitsy experience of planning, accounting and staffing the brigade and on this basis providing conversion of all brigades to the brigade contract method is a way which our ministry sees in further improving the subordinate cost accounting. And the enterprises of the construction materials industry, motor transport organizations, builders and also customers and planning organizations should work here with mutual interest similar to the experience of the Tallin DSK.

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METALWORKING EQUIPMENT

COST ACCOUNTING IN INSTRUMENT BUILDING REPORTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 41, 1971 pp 16-17

[Article by G. Mergelov, chief of the Finance Administration of the Ministry of Instrument Making, Automation Equipment and Control Systems: "Cost Accounting in the Sector"]

[Text] One of the large economic experiments which have been conducted over a number of years in the national economy is the use of cost accounting on the scale of the entire instrument building sector.

Conversion of the sector in 1970 to the new principles of administration, planning and financing should have first intensified the role of the five-year plan (with distribution of tasks by years) as the main form of planning and the basis of organization of economic activity; second, it should have increased the incentives of the ministry, industrial and production associations in adopting higher tasks compared to the five-year plan on production volumes and profits; third, it should have established a direct dependence of the development of the sector on the results of the current activity of the associations and enterprises contained in it. The main task is to more completely meet the needs of the national economy for products of the sector.

The Conditions of the Experiment

The following main conditions of the economic experiment were of important significance in realizing the indicated goals: expansion of the ranks of the ministries in the financial planning and administration sector, the use of long-term economic norms for distribution of profits and planning of the wage fund, provision of guarantees of the ministry on the planned payments to the budget and stimulation of the administrative apparatus for specific final results achieved by the sector.

These propositions were later supplemented by new principles of planning and economic stimulation of scientific research and experimental-design organizations. Thus, a procedure of continuous planning of work in development and introduction of new technology based on orders was introduced and a unified fund for development of science and technology

stimulation at scientific research institutes and design offices was created.

I would like to turn attention toward the importance of the essentially new relations of the sector to the state budget. For the first time in economic practice, the ministry is giving a guarantee to provide payments to the budget on the basis of the normative-fractional method of profit distribution. This means that payments to the budget are made as a minimum in planned sums regardless of the results of production-economic activity. If individual enterprises do not fulfill the plan on profits, payments to the budget are compensated for at the expense of the reserves of the All-Union industrial associations and if they are insufficient--at the expense of the ministry's reserves.

This procedure stimulates all production and administrative sections to operationally eliminate the factors which cause an interruption of the profit plan, to act rapidly on associations and enterprises working unsatisfactorily since their indicators immediately have a negative effect on the overall financial state of the sector complex.

Therefore, a qualitatively new approach to organization of management of associations, enterprises and organizations was required since traditional methods of economic management no longer met the higher requirements placed on the administrative apparatus. Along with introduction of the system of sector cost accounting, the automated sector system--ASU-Fribor--was developed in the ministry. Its efficiency in operational management of associations and enterprises was confirmed by many years of practical use.

Introduction of higher forms of cost accounting expanded the operational-economic independence of the ministry and the All-Union associations, primarily in problems of managing financial resources. Prerequisites were also created for intensifying the economic methods of management and for strengthening the financial base of the sector by the additional profits received.

The cost-accounting mechanism made it possible to intensify stimulation of the collectives of scientific research institutes, design offices and enterprises as a function of the economic effect and quality of developments. Thus, objective prerequisites were created for acceleration of technical progress. Experience shows that the deadlines for design and delivery of products for production are reduced and their technical level and consequently their national economic effectiveness are increased under the new conditions.

Objective analysis of the effectiveness of methods of management and economic activity, as is known, can be given on the basis of stable production-economic results. The ministry has coped successfully with the tasks of the Ninth Five-Year Plan. The volume of production during the five-year plan was increased 2.2-fold, labor productivity was increased 1.8-fold and the return of funds was increased by 23 percent. The national economy received more than 400 million rubles' worth of products above the plan.

Instrument building is also operating stably during the 10th Five-Year Plan. The production volume during the first three years was increased by 36.6 percent compared to a planned 36.2 percent. Labor productivity increased by 31 percent compared to a planned 29.1 percent. The plan is being fulfilled in profits and development and introduction of new equipment. Whereas output of 500-550 new products was assimilated annually at the beginning of the past five-year plan, there are now approximately 800 products. And up to 60 percent of the produced products have been renewed during the five-year plan. The specific weight of products of higher category of quality in the total production volume increased from 8.5 percent in 1975 to 25.1 percent in 1978. The specific weight of these products will reach 40 percent in 1980.

The number of enterprises that did not cope with the planned tasks was reduced considerably in the sector. Thus, the number of plants that are not fulfilling the plans on the volume of product sales did not exceed 2 percent and those for profits did not exceed 3 percent. Additional significant sums of above-plan profits and also several hundred million rubles of taxes from circulation due to above-plan output and sales of consumer goods were introduced into the state budget during 1971-1978 as a result of successful fulfillment of the production plans, product sales and accumulations. Part of the above-plan profits, according to the norms, remained at the disposal of the ministry and was directed along with compulsory deductions to the economic incentives funds of the plans, mainly toward acquisition of highly productive equipment. This made it possible to introduce progressive production processes at many enterprises, to mechanize and automate a number of shops and thus to partially compensate for the reduction in the volumes of capital investments, which occurred counter to the tasks provided by the five-year plan.

Nevertheless, experience showed that it is extremely complicated to apply the new principles of management and planning within the framework of a single sector under conditions of expanding the rights of the ministry of increasing its economic independence in practice. And we now note with great satisfaction that the deficiencies determined during practical implementation of the experiment were taken into account during the course of preparation of measures based on the decree of the CPSU Central Committee and the USSR Council of Ministers dated 12 July 1979. What do these deficiencies include? Let us consider some of them.

What Practice Showed

The methodological and organizational differences in the principles of planning the activity of the instrument building sector under new conditions from the common method of planning, in practice, led to the fact that the experimental conditions established for Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] were not always adhered to by the planning bodies. This is specifically indicated by the practice of refining the production plans and income and expense balances which,

despite the confirmed tasks of the five-year plan and the economic norms, were essentially compiled anew for each year.

Significant difficulties were caused by partial review of wholesale prices for many types of products. The fact is that the plans of enterprises on the volume of sales, profits and payments to the budget are being confirmed in prices effective at the moment the draft of the plan was compiled, while the product is frequently sold according to the new, reduced wholesale prices. The delay in correcting the plan frequently led to removal of circulating funds to the budget and created serious difficulties in the economic activity of the enterprises. Interruption of the stability of economic norms was also directly related to the first two problems.

With regard to the significant corrections of annual plans, constant variation of prices and other factors which did not permit maintenance of the stability of normal deductions from profits, the planning bodies felt it was not feasible to confirm them for the five-year period. Therefore, the norms are being confirmed during the current five-year plan only for one year and essentially serve only to distribute above-plan profits. Under the new conditions they will be confirmed for the five-year plan with distribution by years.

The principle of calculating the normal deductions from profits itself also required methodical refinement. Practice showed that the existing method of calculation does not provide the necessary effectiveness of payment for production funds. Its deficiency is that the norm is established in percent of the balanced profits of industrial enterprises and installation-adjustment organizations, that is, by including profits subject to return to the budget in the form of payments for funds and percent for use of credit. As a result, an increase of fees for funds counter to the planned sum automatically reduces the scope of deductions to the budget from the free remainder of profits in centralized calculations with the budget. A reduction of the value of the fee for funds accordingly increases these deductions. This interdependence of the two basic types of payments to the budget weakens the effect of an important economic lever--fund fees. Therefore, the normal deductions from the profits should be determined from the calculated profits, that is, for the deficit of fund fee and percentage of credit.

The economic norm of the general wage fund, which has been carried by the ministry to the All-Union industrial associations, production associations and enterprises, is used in this sector.

The normative method of determining wages, as indicated by practice, contributes to a greater extent than planning the wage fund in absolute sums to efficient use of labor resources and consequently to an increase of labor productivity. The economic incentives of production sections in saving the wage fund is increasing since part of the saved funds is directed toward additional incentives to workers directly involved in production. The effectiveness of these norms will be higher, the more stable the production plans.

The system of measures to improve planning and restructuring of the economic mechanism, provided by the decree of the CPSU Central Committee and the USSR Council of Ministers dated 12 July 1979, eliminates many of the problems touched on. Complex implementation of these measures in the planning, financing, pricing, material-technical supply and production stimulation sector on the scale of the entire national economy is of important significance. The main thing is to achieve clear practical implementation of the planned program. Its real effect on increasing production efficiency and work quality largely depends on this.

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CERAMIC INSERTS FOR USE IN NUMERICAL-CONTROL MACHINE TOOLS

Moscow MASHINOSTROITEL' in Russian No 8, Aug 79 pp 19-20

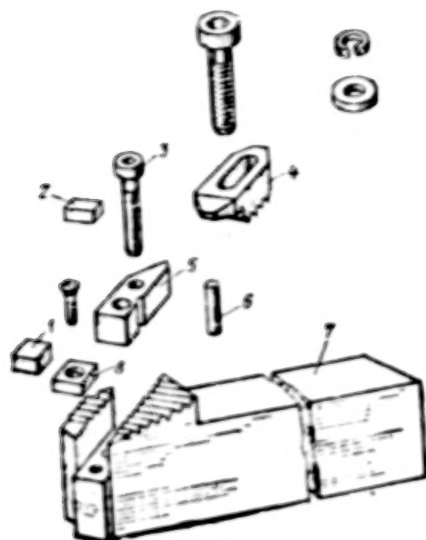
[Article by Candidate of Technical Sciences R. B. Margolit, E. I. Kurkov and I. Ya. Leybson: "Cutting Tools With Ceramic Inserts"]

[Text] Among the most important characteristics of modern domestic and foreign machine tools with program control are their high rigidity, wide range of speeds of the principal (working) movement, and automated tool traversing. Full exploitation of these useful properties of program-controlled equipment requires a cutting tool which can operate with optimal economic life under intensive cutting conditions and can meet stringent requirements regarding the finish of machined surfaces and the precision of their geometric parameters.

Operation of program-controlled machine tools in the Ryazan' Machine Building Production Association (RSPO) indicates that when such tools are available these machines can produce machined surfaces of the 7th quality level, grinding can be successfully replaced by machining with edged tools, and both raw and quenched steel as well as cast iron pieces can be machined by cutting and milling. The association has developed and incorporated reliable designs for cutting tools with mechanically-clamped disposable inserts made of VZ or VOK-60 ceramic. Because these inserts are designed primarily for machine tools with numerical program control, their design calls for maximum rigidity of the holder.

In developing the cutter design, technological difficulties stemming from the stringent requirements regarding the correct shape of the pocket for the insert were overcome. The problem was solved by machining the tool holders on NC machine tools, thereby assuring stable quality of pockets with complex configurations and a high level of labor productivity in the machining. When suitable NC tools are not available, a different holder design incorporating a removable stop, and a different manufacturing process, are recommended; these were also developed by the association.

The diagram shows the design of a holder for a ceramic insert. Holder 7 contains a slot, ground on three sides, with breadth equal to that of the insert. Into the groove is set a rectangular insert made of 2010-0161 or 2010-0162 ceramic



with base dimensions of 12.7 x 12.7 mm and a height of 4.76 or 8.0 mm. Stop 5, which is fastened into the slot by means of screw 3 and pin 6, prevents insert 1 from moving along the slot, while the sides of the slot prevent the insert from turning. Strong clamps 4 and a carbide chip breaker 2 securely clamp the insert, which rests on a carbide seat 8 in the groove. The holder design may vary depending on the purpose of the tool, but in all cases it must provide a secure support for the insert.

Tools (straight turning, face, boring) of various types and dimensions equipped with ceramic inserts can be used to machine raw and quenched steel parts to final dimensions or with minimal allowances of 0.1-0.2 mm for final grinding. When inserts made of VOK-60 ceramic were used to machine four different varieties of shaft on an NC lathe, there was a significant increase in labor productivity compared to machining with T15K6 carbide tips.

The use of ceramic inserts at RSPO has indicated that in machining raw steels it is much more efficient to use white ceramic. The life of inserts made from it is no shorter, and in a number of cases is longer, than that of inserts made from VZ or VOK-60 black ceramic. Comparative durability tests made by the association indicated that not only currently-produced domestic varieties of ceramic but also the previously-used TsM 332 ceramic function well provided that the basic requirements determining the serviceability of ceramic inserts are observed: mechanical clamping with secure seating of the insert on the base surface of the groove, fine finishing of the working surfaces, and proper geometry of the cutting edge chamfer. When the outer surfaces of three sizes of shaft made of 45 steel were turned on an NC lathe with MDW-13 cutting tools having TsM 332 and VOK-60 tips, the life of a single edge was 90 and 30 minutes respectively. In this work the cutting speed v ranged from 250 to 350 meters per minute, the cutting depth t ranged from 1.0 to 1.25 mm, and the feed rate s was 0.25 mm per turn without use of SOZh [lubricating and cooling fluid].

Results of great practical importance were achieved in machining shafts part of whose journals had been heat treated on a TVCh [high frequency current] unit to a hardness of HRC 48-52. This operation was used instead of preliminary grinding and was carried out on a lathe with numerical control. The machining of quenched and raw steel open journals of the shafts was carried out using two cutters of the same type having an entering angle $\varphi = 45^\circ$ and using a square VOK-60 ceramic insert. Each cutter had its own function: one was used to machine raw steel journals and the other to machine quenched steel journals. Machining conditions differed, fulfilling technical requirements regarding the geometric parameters and finish of the machined surfaces as well as optimal tool life. A journal which is to be in contact with the flange of a shaft is machined by a third cutter with a triangular tip operating "face to face" (entering angle $\varphi = 92^\circ$). The surface finish of journals machined with the ceramic was $Ra = 1.25$ microns. Turning of quenched steel shafts made it possible to free up a grinding tool which had previously been used for rough grinding.

The economic effect from the utilization of 2,000 VOK-60 inserts measuring $12.7 \times 12.7 \times 4.76$ mm was about 23,000 rubles. It is advisable to make extensive use of this progressive cutting material in semifinishing operations on steel and cast iron parts. As the range of sizes of ceramic inserts--primarily those with a height of 8 mm--in mass production in this country's industry expands, it will become possible to use ceramics for rough machining under more stringent cutting conditions. It must be borne in mind that effective utilization of ceramic inserts and efficient processes for producing tools with mechanical clamping of the inserts depends on employment of NC machine tools in the national economy, since they make possible the most effective utilization and manufacture of these advanced cutting tools.

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